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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,765	10/04/2004	Jerome L. Cann	BUR920040035US1	5764

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EXAMINER
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LEE, HSIEN MING

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 09/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/711,765

Applicant(s)

CANN ET AL.

Examiner

Hsien-ming Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 20 is/are rejected.
- 7) ☒ Claim(s) 18 and 19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

HSIEN-MING LEE  
PRIMARY EXAMINER

9/6/06

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 20050301.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 19 is objected to because of the following informalities: limitations” is selected from the group comprising: europium..... or Eu hexfluoroacetate” should have been written as -- is selected from the group consisting of : europium..... and Eu hexfluoroacetate. See M.P.E.P. 2173.05 (h) Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-17 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Mikolas (US 2004/0005769).

In re claim 1, Mikolas, in Figs. 5A-5D and corresponding text, teaches a method of forming a semiconductor structure, comprising:

- providing a first material 51 and a second material 52/53;
- processing the first material 51 to form a portion of the semiconductor structure, i.e. polishing the first material 51 (from Fig. 5A to Fig.5D); and
- detecting a condition of the second material to determine whether processing of the first material is complete, i.e. detecting the presence of a fluorescent material 52 in

the second material 52/53 to determine the endpoint of the polishing (from Fig. 5B to Fig.5D and paragraph [0078]).

In re claim 2, Mikolas teach that the second material 52/53 comprises a fluorescent material 52 and wherein the detectable condition of the second material 52/53 comprises a fluorescence of the second material 52/53 (paragraph [0078]).

In re claim 3, Mikolas teaches that the second material 52/53 is formed below the first material 51 (Fig.5A).

In re claim 4, Mikolas teaches that processing comprises removing a portion of the first material 51 (from Fig. 5A to Fig.5D).

In re claim 5, Mikolas teaches removing the second material 52/53 having the detectable condition (i.e. the fluorescent material 52 in the second material 52/53 is detectable), and wherein process of the first material 51 is complete upon removal of the second material, i.e. the removal of first material 51 is complete upon removal of the fluorescent material 52 in the second material 52/53 (from Fig. 5A to Fig.5D).

In re claim 6, Mikolas teaches that the processing of the first material 51 is incomplete if the detectable condition of the second material 52/53 is detected, i.e. the removal of the first material 51 is incomplete if the fluorescent material 52 in the second material 52/53 has not been detected (paragraph [0078]).

In re claim 7, Mikolas inherently teaches that if the processing of the first material 51 is incomplete (i.e. the removal of the first material 51 is incomplete), continuing the processing of the first material 51; detecting the condition of the second material 52/53 (i.e. detecting if the fluorescent material 52 in the second material 52/53 appears after removing or polishing the first

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material 51); and repeating the process and detecting steps until the detectable condition of the second material is not detected (i.e. repeating the polishing process and detecting the presence of the fluorescent material 52 of the second material until the fluorescent material 52 is not detected to reach the endpoint of the polishing).

In re claim 8, Mikolas teaches that the second material 52/53 comprises a sacrificial layer 52 formed below the first material 51 and having the detectable condition (i. e. the fluorescent material 52 is detectable and would reveal fluorescence).

In re claim 9, Mikolas teaches that the sacrificial layer 52 comprises a fluorescent material (paragraph [0078]) and wherein the detectable condition comprises fluorescence.

In re claim 10, Mikolas teaches that the processing comprises chemical-mechanical polishing (CMP) (paragraph [0078]).

In re claim 11, Mikolas teaches that the second material 52/53 comprises a fluorescent material, wherein the detectable condition of the second material 52/53 comprises fluorescence (paragraph [0078]) and wherein the fluorescence of the second material 52/53 is provided by doping the second material (paragraph [0080], line 5).

In re claim 12, Mikolas teaches that the second material 52/53 comprises a substance 53 (i.e. a dielectric material) provided on the first material 51, wherein the substance includes a tag having the detectable condition.

In re claim 13, Mikolas teaches that the processing of the first material 51 is complete when the detectable condition of the tag is detected only on areas of the semiconductor device selected from the group consisting of: expected areas of the first material 51 (i.e. the expected polished area of the first material 51).

In re claim 14, Mikolas teaches that the detectable condition of the tag comprises fluorescence (paragraph [0078]).

In re claim 15, Mikolas teaches that the tag comprises a fluorescent molecule (i.e. the fluorescent molecule presented in the florescent material 52, paragraph [0078]) that provides the detectable condition, and wherein the fluorescent molecule binds to a material selected from the group consisting of the material 53 of the semiconductor structure.

In re claim 16, Mikolas teaches a semiconductor structure 52/53 for detecting completion of the processing of a material 51, comprising a sacrificial layer 52 formed below the material 51, the sacrificial layer 52, which is a fluorescent material (paragraph [0078]), having a detectable condition (i.e. would reveal fluorescence which is detectable).

In re claim 17, Mikolas teaches that sacrificial layer 52 comprises a fluorescent film (paragraph [0078]), and wherein the detectable condition comprises fluorescence.

In re claim 20, Mikolas teaches a method of forming a semiconductor device, comprising providing a fluorescent material 52; and using a fluorescence of the fluorescent material 52 to determine a presence of a predetermined material 51 of the semiconductor device, as stated in the rejection against claim 1.

***Allowable Subject Matter***

4. Claims 18 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. Claim 19 would be allowable if rewritten to overcome the objection as set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

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6. The following is a statement of reasons for the indication of allowable subject matter:

None of the prior art of record, either alone or combination, teach or suggests that the material comprises a liner for interconnects in a wiring level and the sacrificial layer is selected from EuTTA, chelates of La, Sm, Eu, Gd, Lu, Yb, Tb, Dy or Tm or (beta)-diketone chelates including Eu benzolacetate, Eu dibenzoylmethide or Eu hexafluoroacetate.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsien-ming Lee whose telephone number is 571-272-1863. The examiner can normally be reached on Tuesday-Thursday (7:30 ~ 6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Hsien-ming Lee  
Primary Examiner  
Art Unit 2823

Sep. 6, 2006

HSIEN-MING LEE  
PRIMARY EXAMINER



9/6/06